

Claims

- [c1] 1.A vehicle for lifting and transporting a container, the vehicle comprising a substantially U-shaped frame, said frame having first and second substantially parallel beams, said beams being spaced apart to receive a container there between, and being deflectable towards and away from each other, at least one wheel pivotally mounted on said first beam, said wheel pivoting to deflect said first beam away from or toward said second beam as said vehicle is moved forward or backward.
- [c2] 2.The vehicle of claim 1 wherein said beams are flexible and bow outwardly or inwardly in response to the pivot of said wheel.
- [c3] 3.The vehicle of claim 1 further comprising a control unit, said control unit comprising operator controls and having steerable wheels, said beams being connected to said control unit.
- [c4] 4.The vehicle of claim 3 wherein said beams are flexible and bow outwardly or inwardly in response to the pivot of said wheel mounted on said beam.
- [c5] 5.The vehicle of claim 1 wherein said first beam further comprises an inner wall and an outer wall and said pivotally mounted wheel is mounted between said inner and outer walls on a wheel axle, said wheel axle being supported by an inner arm and an outer arm, said inner arm being connected to a first pivot, said first pivot being connected to said first beam adjacent said inner wall of said first beam, said outer arm being connected to a second pivot, said second pivot being connected to said first beam adjacent said outer wall of said first beam, said axle, said first pivot and said second pivot being non-coplanar.
- [c6] 6.The vehicle of claim 5 wherein said second pivot is higher than said first pivot.
- [c7] 7.The vehicle of claim 6 wherein a line between said first and second pivots is elevated from horizontal by an angle of between 0.5 and 10 degrees.
- [c8] 8.The vehicle of claim 7 wherein said angle is between 1 and 6 degrees.

- [c9] 9.The vehicle of claim 8 wherein said angle is between about 2 and 3 degrees.
- [c10] 10.The vehicle of claim 6 wherein said first and second pivots are connected by a support axle.
- [c11] 11.The vehicle of claim 10 wherein said first arm and said second arm are rigidly connected to said support axle and said support axle is pivotally connected to said first beam and further comprising an hydraulic cylinder coupled between at least one of said first and second arms and said beam, said hydraulic cylinder raising and lowering said beam with respect said wheel and simultaneously causing said wheel to pivot with respect to said beam.
- [c12] 12.The vehicle of claim 11 wherein said wheel pivots as the beam is raised above a neutral position such that the beam is forced outwardly when the vehicle is driven backward towards an open end of said U-shaped frame and wherein said wheel pivots as the beam is lowered below said neutral position such that the beam is forced inwardly when the vehicle is driven backward.
- [c13] 13.The vehicle of claim 11 wherein said support axle comprises an inner cylinder connected between said inner and said outer walls of said beam, said cylinder having an air flow passage opening through said walls, and a sleeve rotatably mounted around said inner cylinder, said arms being rigidly connected to said sleeve.
- [c14] 14.The vehicle of claim 5 wherein said vehicle further comprises at least one electric motor coupled to said wheel axle of said at least one wheel.
- [c15] 15.The vehicle of claim 1 further comprising at least one second beam wheel pivotally mounted on said second beam, said second beam wheel pivoting to deflect said second beam away from or toward said first beam as said vehicle is moved forward or backward.
- [c16] 16.The vehicle of claim 15 wherein said beams each further comprise an inner wall and an outer wall and said pivotally mounted wheels are each mounted between said inner and outer walls on a wheel axle, said wheel axles being supported by

an inner arm and an outer arm,
said inner arm being connected to a first pivot, said first pivot being connected to the respective beam adjacent said inner wall of said respective beam,
said outer arm being connected to a second pivot, said second pivot being connected to a respective beam adjacent said outer wall of said respective beam,
said axle, said first pivot and said second pivot being non-coplanar and said second pivot being higher than said first pivot.

[c17] 17.The vehicle of claim 16 wherein said first and second pivots are connected by a support axle and said first arms and said second arms are rigidly connected to said support axle and said support axle is pivotally connected to a beam and further comprising an hydraulic cylinder coupled between at least one of said first and second arms and said beam, said hydraulic cylinder raising and lowering said beam with respect said wheel and simultaneously causing said wheel to pivot with respect to said beam, said wheels pivoting as the beams are raised above a neutral position such that the beams are forced outwardly when the vehicle is driven backward towards an open end of said U-shaped frame and said wheels pivoting as the beams are lowered below said neutral position such that the beams are forced inwardly when the vehicle is driven backward.

[c18] 18.The vehicle of claim 17 further comprising a control unit, said control unit comprising operator controls and having steerable wheels, said beams being connected to said control unit, said beams are flexible and bow outwardly or inwardly in response to the pivot of said wheels mounted on said beams.

[c19] 19.The vehicle of claim 15 wherein each beam further comprises a ledge along said inner wall of said beam for supporting a container between said beams.

[c20] 20.The vehicle of claim 19 wherein each beam further comprises means for preventing said beams from spreading apart from each other.

[c21] 21.The vehicle of claim 20 wherein said means for preventing the beams from spreading comprise means for connecting to a container positioned between the first and second beams.

- [c22] 22.The vehicle of claim 21 wherein said means for connecting comprise a spade connected to said beam and adapted to be received in a sleeve on said container.
- [c23] 23.The vehicle of claim 22 wherein said spade is mounted near a wheel on a beam.
- [c24] 24.The vehicle of claim 23 wherein said beams each further comprise an inner wall and an outer wall and said pivotally mounted wheels are each mounted between said inner and outer walls on a wheel axle, said wheel axles being supported by an inner arm and an outer arm, said inner arm being connected to a first end of a support axle, said outer arm being connected to a second end of said support axle, said wheel axle, and said support axle being non-coplanar and said second end of said support axle being higher than said first end of said support axle and said first arms and said second arm being rigidly connected to said respective support axle and said support axle is pivotally connected to a beam and at least one spade is mounted on said beam near each support axle.
- [c25] 25.The vehicle of claim 1 further comprising means for pivoting said wheel, control means for automatically controlling said pivoting means and a sensor coupled to said control means , said sensor producing a signal representative of motion of said vehicle, said control means responsive to said sensor.
- [c26] 26.The vehicle of claim 5 further comprising means for pivoting said wheel, control means for automatically controlling said pivoting means and a sensor coupled to said control means , said sensor producing a signal representative of motion of said vehicle, said control means responsive to said sensor.